

USIB-D-71.1/2
14 May 1968
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UNITED STATES INTELLIGENCE BOARD

MEMORANDUM FOR THE UNITED STATES INTELLIGENCE BOARD

SUBJECT : NSAM 368 (Intelligence Information-Handling System)

REFERENCE : USIB-D-71.1/1, 22 April 1968, Limited Distribution

1. The attached copy of a memorandum on the subject for the Director of Central Intelligence (DCI) from the Special Assistant to the President for National Security Affairs with respect to the response to NSAM 368 by the DCI enclosed with the reference paper, is circulated for the information of the United States Intelligence Board (USIB).

2. Mr. Helms has referred the attached memorandum from Mr. Rostow to Mr. Bross, D/DCI/NIFE, for appropriate action in preparing, with the assistance of all USIB member agencies, a response to the request for a further report by October 22, 1968.



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Executive Secretary

NSC review
completed.

Attachment

Distribution List Attached

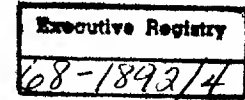
NSA review
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DIA review(s)
completed.

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completed

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CONFIDENTIALTHE WHITE HOUSE
WASHINGTON

May 8, 1968

MEMORANDUM FOR THE DIRECTOR OF CENTRAL INTELLIGENCE

SUBJECT: NSAM 368 (Intelligence Information-Handling System)

Please refer to your memorandum for the President dated April 22, 1968, in response to the provisions of NSAM 368 which called for (1) the preparation, in consultation with the President's Foreign Intelligence Advisory Board, of a plan for the phased implementation of a community-wide information-handling system for the secure and efficient processing, storage, retrieval and dissemination of intelligence information, (2) a discussion of alternative ways to manage such a system, together with your recommendation with regard thereto, (3) an identification of the costs and benefits of each phase of the program including a detailed proposal for the first annual increment as part of the FY 1970 budget, and (4) submission of the plan, with the concurrence or comments of the Departments of State and Defense, to my office by May 1, 1968.

Your memorandum of April 22 provides useful information as to the progress made thus far in planning for improved information-handling systems within the U. S. intelligence agencies, and in identifying the preliminary actions to be taken in preparation of a long range plan looking toward the development of a community-wide system. While it is noted in your memorandum that you are presently unable to indicate the time phasing of actions that remain to be taken, it is hoped that your next submission in response to the NSAM can provide the President with a more definitive picture of the projected community-wide system. It would also be helpful to have a report on the progress made by the individual departments and agencies in the development of information-handling systems which meet their respective needs and fulfill the requirements of the projected over-all system; the estimated costs allocated to successive phases of the development of the community-wide system; and a more precise

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estimate as to time phasing. Accordingly, it is requested that there be furnished to this office and to the President's Board by October 22, 1968, a further report along these lines, including information responsive to the requests set forth in NSAM 368 as enumerated in the first paragraph of this memorandum.

W W Rostow

W. W. Rostow

cc: The Secretary of State
The Secretary of Defense
Director, Bureau of the Budget
Special Assistant for Science and Technology
Chairman, President's Foreign Intelligence Advisory Board

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Date 14 May 68

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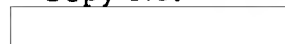
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USIB-D-71.1/1
22 April 1968
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UNITED STATES INTELLIGENCE BOARD

MEMORANDUM FOR THE UNITED STATES INTELLIGENCE BOARD

SUBJECT : Response to NSAM 368 by the Director of Central Intelligence

REFERENCES : a. USIB-D-39.1/8, 29 March 1968
b. Memorandum for Holders of USIB-D-39.1/8, 1 April 1968
c. USIB-M-503, 4 April 1968, Items 4 and 5
d. USIB-M-504, 11 April 1968, Item 6

1. The enclosed copy of a memorandum for the President from the Director of Central Intelligence (DCI) in response to NSAM 368 is circulated herewith for the information of the United States Intelligence Board.

2. The enclosed memorandum reflects the Board's discussion and actions in references c. and d. It also incorporates as Annexes E - H of Attachment A the summary reports submitted by the Department of State, CIA, DIA and NSA as requested in reference b. A single copy of the detailed reports, which are to be forwarded separately as Attachment B to the Memorandum for the President, will be held in the Intelligence Information Handling Committee (IHC) Support Staff for reference.



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Executive Secretary

Enclosures:

Distribution List Attached
Discussed at 11 Apr 68 USIB
Meeting, USIB-M-504
See IHC Comm File for
copy as presented to Pres.



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THE DIRECTOR OF CENTRAL INTELLIGENCE
WASHINGTON, D. C. 20505

22 April 1968

MEMORANDUM FOR THE PRESIDENT

SUBJECT: NSAM 368

This report is submitted in response to the instructions contained in NSAM 368. It covers projects now under way in the intelligence community which will contribute to the development of a system to improve the dissemination, processing, storage and retrieval of intelligence information throughout the intelligence community. Specifics are appended as Annex A to provide an outline of what must be done to arrive at a long range plan for improved information handling. These include the categories of studies and experiments that will be necessary, together with indication of the time phasing of their relationships to one another. It will take some time to get this all done. I can't tell yet just how long.

A community-wide information handling system will follow from the continuous improvement and integration of the component agency systems, which are being automated as rapidly as feasible. Some of the automated agency systems are already fully operational and others soon will be. They will serve to expedite and facilitate

S E C R E T

the exchange and availability of information among agencies and contribute to the elimination of undesirable duplication in filing and processing information.

Subsequent to the issuance of NSAM 368, USIB approved a Statement of Objectives for Intelligence Information Handling. The Statement provides guidance for the continuing activities which must be undertaken to ensure the orderly development of a community-wide system for intelligence information handling. USIB has also approved a revised DCID 1/4, establishing a new Intelligence Information Handling Committee with terms of reference tied directly to the Statement of Objectives. These two actions (Annex B) establish the policy of USIB concerning the intelligence information handling problem.

Integration of intelligence community efforts in the field of information handling will proceed under my direction. With the advice of USIB and using the Chairman of the newly approved Intelligence Information Handling Committee as my direct representative, I expect to achieve effective management control. I believe that these arrangements will ensure that the experience and talent of the USIB member agencies are effectively pooled and at the same time will preserve the developmental and support facilities required to meet the specialized needs of individual agencies.

S E C R E T

An inventory has been made with the help of the member agencies of those activities and systems that relate to intelligence information handling. Attached are a status report on the Community On-Line Intelligence System (COINS) (Annex C), a listing of other selected community projects (Annex D) and summaries of activity at State, CIA, DIA and NSA (Annex E through H). A more detailed report covering these four intelligence agencies is being forwarded under separate cover as an additional attachment to this report.

Accomplishment of a community system will require a number of adjustments. While these will not include alteration in the basic responsibilities of agencies, they will involve financial arrangements and coordination of data exchange to insure that the financial burden does not fall disproportionately on one or a few agencies. I will take these up with the appropriate managers as the occasion requires.

It is clear from the work already accomplished that the development of any information handling system on an agency or community basis requires allocation of resources well beyond those made available in the past. This has not been a seriously inhibiting factor to date because much of the work so far has been of an experimental and developmental nature. We are now in the equipment installation and operation stage in many of the agencies and the

requirement for resources will mount rapidly. This will affect budgets throughout the community.

The significance of these points, and others, will become clearer as the detailed planning proceeds. I will report to you as significant milestones in the program have been reached.


Richard Helms

Attachment A: Annex A through H herewith
Attachment B: Forwarded under separate cover

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ATTACHMENT A

- Annex A - Outline of Some Preliminary Action to be Taken
in Preparation of Long Range Plan.
- Annex B - USIB Statement of Objectives for Information Handling
and DCID No. 1/4 Establishing a New Intelligence
Information Handling Committee.
- Annex C - COINS Summary Report.
- Annex D - Selected Community Information Handling Programs.
- Annex E - State Department Summary.
- Annex F - CIA Summary.
- Annex G - DIA Summary.
- Annex H - NSA Summary.

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— C-O-N-F-I-D-E-N-T-I-A-L —

ANNEX A

OUTLINE OF SOME PRELIMINARY ACTIONS TO BE TAKEN
IN PREPARATION OF LONG RANGE PLAN

PHASE I

Studies.

Definition of the information handling problem.

Analysts' processes and uses of information.

User requirements for information service.

Future communications requirements for information exchange.

ADP security problems.

Rapid input systems.

Rapid search and readout systems.

New concepts for exchange and interaction.

Document storage and retrieval by use of videofile, closed circuit television, LDX or other means.

Relative costs of file duplication versus communications costs to achieve sharing of files.

Experiments.

COINS.

Tape exchange.

Overnight information updating via COINS.

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Experiments (con't).

Secure circuit voice response.

Exchange of formatted reports of end products
by various means.

Exchange of microform-photochip.

Evaluation.

Definition of Phase II and plan for next generation
of community information handling system.

PHASE II

Implement Phase II plan for community information handling
system.

Expand use of system.

Improve timeliness of response.

Incorporate interactive problem-solving into system.

Incorporate graphic operations and image exchange into
system.

PHASE III

Further improvement of Phase II as state of the art permits.

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ANNEX B

Annex B as forwarded consisted of the following
USIB-approved attachments to USIB-D-71.2/1:

- A - USIB "Objectives for Intelligence
Information Handling"
- B - Director of Central Intelligence
Directive (DCID) No. 1/4,
"Intelligence Information Handling
Committee"

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ANNEX C

Community On-Line Intelligence System (COINS)

1. Background. This is a brief progress report on the COINS experiment which is being conducted under the general supervision of DIRNSA in order to implement the President's Foreign Intelligence Advisory Board Recommendation No. 2 of 15 June 1965. The concept calls for DIA, NSA and CIA to maintain COINS files in their own information retrieval computer systems which will be connected by secure data links through a central switch at DIA. The Department of State and the National Indications Center (NIC) will have remote query consoles connected to the DIA computer through which they can interrogate COINS files.

2. Significant Milestones and Current Status

a. On 21 December 1966 a secure 300-character-per-second (2400 BPS) data link was installed between an NSA computer complex and the DIA network switch.

b. The first test message was transmitted on 13 February 1967. The first successful interagency test between a remote terminal at NSA and the computer at DIA and between a remote terminal at DIA and the computer at NSA occurred on 20 April 1967 using unclassified files.

c. In early September 1967 NSA and DIA selected COINS files were made available and the COINS links between NSA and DIA was activated

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for two hours a day, two days each week. On 2 October 1967 the link became active for two hours each day, five days a week, and on 12 January 1968 for six hours per day, five days per week.

d. The system is currently undergoing further testing to detect and eliminate system faults. A date when the NSA-DIA link can be declared "fully operational" twenty-four hours a day, seven days a week, cannot be stated at this time.

e. Circuits from the central switch to CIA are being activated at the present time. The Department of State and the National Indications Center will be connected by July 1968.

f. On 11 April 1968 the DCI designated DIRNSA as executive agent to carry out the balance of the experiment. The DCI will provide guidance to DIRNSA through the NIPE staff.

3. Training and Familiarization. The COINS experiment still requires a concerted effort to acquaint the user analyst with the system files and the procedures required to access them. Although the COINS system has been kept simple and small, minimal instruction to permit the analyst to interact with these files requires careful preparation and presentation.

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4. Test and Evaluation. The testing of COINS will start in July 1968, with evaluation to follow. This process will run for one year with a final report to be submitted to USIB prior to the end of December 1969.

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ANNEX D

Selected Community Information Handling Programs

1. Biographic Intelligence. Selected biographic files are now available in the COINS experiment. An investigation of biographic activity has led to the selection of these files and to the development of new projects in the security name check system. This investigation has been expanded to determine what biographic intelligence would be useful to a community-wide information system and how it ought to be handled in the system.

2. Research and Development. The desirability of undertaking selected R&D projects and of exchanging information on them is recognized and progress has been made, including the establishment within CIA of an R&D experimental facility for the development of new techniques in information processing. NSA has an established R&D facility with information handling related projects under way, and DIA is in the process of developing a capability in this area. As soon as qualified personnel can be assigned, an R&D subcommittee of the new Intelligence Information Handling Committee will be formed to carry out the stated USIB objective in this area.

3. Training. The individual agency training programs in information science have been expanded and during the past year

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various courses running in length from three days to a full academic year were attended by 8166* persons. Sixteen percent of these courses were at universities or technical training schools. The total training given amounted to approximately 350,000 manhours.

The following table summarizes the information science training under four broad categories:

<u>Type of Training</u>	<u>No. of Persons*</u>	<u>%</u>
General Orientation	2003	25
Methods and Techniques	2408	37
Computer Programming	3058	29
Systems Analysis, Design and Implementation	697	9
	<u>8166</u>	<u>100</u>

As a service to the intelligence community, the Defense Intelligence Agency established an Information Science Center in the Defense Intelligence School in December 1967. The first regular courses open to students from the intelligence community were scheduled to start in January 1969. There has been considerable difficulty in recruiting a competent faculty within the civilian grade structure authorized, and this may delay the start of the courses.

*These figures do not accurately reflect the actual number of individuals since some - perhaps as many as one half - took more than one course during the past year.

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4. USIB-approved Programs. USIB has also approved the following programs which are now under development:

- a. The Automated USIB File and Program Catalog System;
- b. The USIB Item Register;
- c. The USIB Installation Register;
- d. The Content Control Code;
- e. Photo-chip Standardization.

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ANNEX E

The Department of State Substantive Information System

The Department of State has recently completed its analysis of present substantive information handling practices and, based on the findings, has designed a modern information system. It should be noted that the terms "substantive information" (as used in the Department) and "intelligence" (as used in the intelligence agencies) are generally synonymous. The systems, both present and future, are described in detail in "A Modern Information System for the Department of State", December 1967. A brief synopsis follows below.

1. Present Practices

- a. Dissemination: The present system of dissemination is characterized by a dispersion of entry points for various types of information. The Communications Center receives and distributes telegrams, the Records Services Division receives and distributes Airgrams and other pouch mail, and the Bureau of Intelligence and Research handles all input from intelligence components of other agencies. In addition, a large volume of substantive information comes into the Department addressed to individual bureaus and is handled by the addressee. All documents not directly addressed to individuals or components are read and distributed in terms of requirements submitted (generally annually). These requirements are not the end users' but reflect only the consolidated needs of the Bureaus. Consequently, dissemination is made only to the Bureau level. Here, a second reading of the documents is required to determine the needs of offices within each Bureau, and in some cases two or more additional readings are performed before a document reaches a desk. Direct address mail goes to the addressee and is usually not disseminated further, regardless of who might have need for the information. No mechanism exists for alerting others to the existence of such information.

The dissemination process in the Department is entirely manual. It is confined to the distribution of documents and is oriented toward the handling of paper rather than information.

- b. Storage and Retrieval: Existing practices in the Department of State for preserving foreign policy information and enabling officials to use such information consist of storing documents in files and using file folder headings to locate documents containing needed information.

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There are three types of files in general use in the Department-Central Foreign Policy files, authorized Decentralized files, and individual working files. Since the establishment of these various files is based on the principles of records management rather than information management, it is impossible to find required information on any problem in any one place. The Central Foreign Policy File is the major repository for all Airgrams and telegrams, but the 33 authorized decentralized files held by designated bureaus for subjects of prime interest to them contain most other materials.

All intelligence agency produced materials, for example, are filed in the Bureau of Intelligence and Research. Bureau working files contain a variety of materials including communications, publications, intelligence and other information from foreign and domestic sources. Many documents are duplicates of those maintained in the Central Foreign Policy File, the decentralized files, and other bureaus' working files.

Files are organized by subject matter and generally follow the Department's Records Classification Handbook. Most offices also maintain a chronological file. As stated above, the Central Foreign Policy Files is far from complete. All offices must retire material which is three years old. In the five years following this retirement, the material is screened for documents which properly belong in the Central File. Since documents of "continuing interest" may be excluded from retirement and retained by an office, the central repository still remains incomplete even after eight years.

To retrieve information, officers rely heavily on their own working files. Occasionally, they will call on the Central Foreign Policy File, or other files known to them. In most cases, however, if the required information is not in their own files, they will contact a colleague in the Department or in another agency who might throw light on the problem or have a pertinent document.

In summary, the Department's files are set up for the preservation of records rather than to facilitate the use of information. The Department has no adequate retrieval system. As a result, the individual officer overtaxes the various dissemination systems to stay alert to relevant information, and he spends much time and effort in building his own file. Despite this, he still has incomplete information.

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- c. Collection Guidance: There are three principal ways in which collection requirements are generated. First, the Foreign Affairs Manual Series provides broad guidance in the fields of political and economic reporting. Second, the Department relies heavily on field initiative. The reporting officer is expected to use his judgment to report anything he deems significant "even though it is not listed in...outlines." And, finally, the reporting officer responds to specific queries from the Department. There is, however, no effective coordinating organization to supervise the systematic collection of needed information. The Foreign Reporting Staff of the Bureau of Economic Affairs checks requests for economic/commercial information against a set of agreed criteria before passing it to the field for collection. Requests for Biographic information, maps, and photographs are passed to another agency for search of an existing data base to determine if the information is already available. For all other categories, the user may levy his requirements directly on the embassy he deems most competent to collect the desired information. In the absence of a selective dissemination and a reliable retrieval system, the latter route is often the only means a user has available to get information.

2. Proposed Information System

The future system in the Department of State will be an integrated, computer based, on-line document, information, and data system. End users, rather than bureaus, will submit detailed dissemination requirements to a central processing organization. User profiles will be entered into the computer. All documents and information (with a few exceptions) will enter the Department through this central organization. Documents will be indexed and the index matched against the profiles to determine dissemination. The user will have the option of receiving documents (for subjects of prime concern) or periodic proxies (accession lists, extracts, etc.) which may serve his peripheral interests. He will be able to change his profile daily, if necessary to adjust to changing requirements.

The same index records will also serve future recall. While the index records reside in the computer, the document will be retained in some form of microfilm. It is recognized that some special collections of documents must remain outside the central system. The index records to these collections, however, will be entered in the computer so that all queries can be levied against a central, single reference point. The recall sub-system will also be able to provide proxies,

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such as summaries and abstracts in place of the full document. In addition, the system will contain automated information files, e.g. political parties/elections, foreign scientific relations, treaties, laws, agreements; and data files, e.g. country data, tariff data, demographic statistics, gross national product. The system will include information and data files of importance to the conduct of foreign affairs created by or built jointly with other agencies.

The existence of a reliable recall and dissemination system will make it possible to establish a collection guidance sub-system which will continuously review the Department's needs, monitor collection capabilities, maintain a requirements registry, and coordinate the collection activities of the Department with those of other agencies.

The new system will provide the user with fewer documents and more pertinent information. It will remove the need for multiple reading of documents at various levels by reacting directly to the end users needs. The central reference service will make the total data base available to the user, and he will have data and information available in addition to documents.

3. Existing Automated Systems

The Department has two major automated systems in operation. One is the Automatic Terminal System (ATS), a computer controlled communications switching system. The other is the External Research Publishing and Retrieval System (XPARS) described in Attachment 3.

4. Cost

The Department (in Washington) currently uses approximately 400 man/years to perform the document handling functions described above at a cost of about \$4,000,000 p/a. Without modernization, it is estimated that this cost will increase to about \$4.8 million in the next five years. The proposed system is to be developed over a five year period, will require 369 people and will be operated on an annual budget of \$4.8 million (including hardware). The development cost is estimated at \$5.5 million. It should be noted that no funds are available at this date to proceed with the implementation.

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ANNEX F

Central Intelligence Agency

I. Information Processing Program

1. The CIA Information Processing and Exploitation Program for FY 1969-73, which is now being processed as part of our annual PPB cycle is as follows:

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2. The fundamental objective of the Central Intelligence Agency's information processing and exploitation program is to support the analyst who produces finished intelligence and the operational personnel who collect information and carry out operational assignments. Guided by the intelligence requirements and operational decisions of policy officials, analysts and operators need information to make informed judgments and estimates. To make such judgments and estimates themselves and to evaluate the work of others, producers of finished intelligence must have access not only to the raw data but also to the methodology by which the data may have been processed. Although such access is within the computer state-of-the-art and is provided in specialized automated and manual files, its incorporation into a community computer network demands a sophistication of software design and a computer security environment which are clearly not within the current state-of-the-art. Both because of previous limitations in the state-of-the-art and the absence of persuasive evidence of gain to the analyst, the Agency has proceeded cautiously with the creation of large automated central files. In an effort to control the input of information to his files and the way the information is manipulated, including the proper application of security compartmentation, the analyst has preferred limited access files whether or not the files are automated.

3. The large central storage and retrieval files of the CIA (and other intelligence agencies) have been used mainly to meet general reference requirements. They have tended to contain index

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or pointer data to documents or to other files rather than to contain information per se; a major goal of more recent system design has been provision of more rapid and accurate information retrieval. Several attempts in the USIB Community to create such files have died a boring and others have been characterized by low use rates, unsatisfactory response (in terms of analyst requirements), and, high maintenance costs. We have renewed this effort in the light of the latest advances in the technology of information handling but we intend to proceed cautiously in view of the serious problems remaining, particularly the high costs for input to such files.

4. Although we have sought to keep abreast of advanced technology and to apply it as it proved feasible and desirable, we have not installed automated methods for their own sake. In many instances, we have found that manual methods provide the only economical and workable solution to our data handling problems. We have constantly improved these methods, and replaced them as appropriate, with automated methods. Typically, however, automated systems have involved more than the mere mechanization of existing processes. Rather, they have involved the redesign of files and procedures and the generation and manipulation of data which could not have been handled by manual systems. Finally, automated systems have themselves been constantly reviewed and improved where such action was needed. We have kept in mind that automated systems must be familiar to the user and acceptable to him, and that they are an improvement only if they better serve the intelligence operator and the producer of intelligence.

5. We consider as an important requirement the continuous development of compatible data elements, computer programs and processing equipment not only for large integrated systems but also for the optimal operation of manual or specialized automated systems. At the same time, standardization can become a fetish which overlooks the unique requirements of individual agencies and which limits creativity and the analytical power of automated systems. When this occurs productivity is reduced rather than increased. Our objective in standardization has been productivity rather than unanimity.

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6. Although the design and maintenance costs of automated data handling are high, the processing costs are low. The effort to control the level of expenditure of the Agency in the face of rising cost of men and materials and the increasing use of expensive technical methods of collection has given us a strong incentive to adopt new techniques whenever they offered economies. In recent years, four large automated systems, two in advanced stages and two in the early operational stages, have been undertaken by the Agency. Withal, the cost of information handling continues to rise. Processing economies per unit have been more than offset by increases in the volume of information we process. Our present planning contemplates that total expenditures will level off after 1970, but this planning is based upon the evolution of present systems rather than on a jump into large automated community systems. We can spend more for automated systems than we have. But we can do so only at the expense of severely declining returns (cost-benefit ratios).

II. Summary of Major Information Processing Projects

7. The intelligence information processing activities of the CIA have been undertaken to support and extend analytical effort rather than as ends in themselves. They have been limited by the conventions of the intelligence environment (such as compartmentation and need-to-know), but they have consistently sought to provide analysts with as complete and relevant a body of information as was available within these limitations.

8. Agency ADP activity can be divided into several major categories; 1) general information storage and retrieval projects -- the library-like systems which are repositories of a spectrum of information broadly relevant to the needs of analysts and operators, 2) special information storage and retrieval projects -- the personal, organizational, or speciality files which serve a single analyst or a group of analysts working in a common field, 3) data reduction systems -- applications characterized by a large body of data which must be perused in its entirety to select a small parcel of relevant information, 4) data transformation systems -- a process to change data from the form in which it is originally received to an acceptable form for another analytical operation. Although a particular Agency project may fall in more than one of the above categories this categorization is useful for discussion of processing activities.

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General Information Storage and Retrieval Projects

9. The CIA has been engaged over the past 6 years in a major effort to redesign its central information storage and retrieval activities. This effort has focused on the application of modern automated techniques of information handling and on replacing a multiplicity of central information systems, compartmented by collection source and security classification, with a more generalized and flexible system. The design objective of this effort was to simplify the accession and classification of intelligence information and to improve significantly the value to the analyst of newly structured all-source files.

10. The design effort is essentially complete and the Agency has begun to implement several major elements of the new system, including the development of all-source files, the organization of central reference analysts by region, document indices produced in machine readable form, and automated computer search and retrieval designed to operate in either a batch or on-line mode. The major remaining element, a complete set of computer programs (CAPRI) to support general information systems will be completed this summer. Thus, we expect that it will be at least 18 months before a preliminary operational evaluation of our general information system can be achieved.

Special Information Storage and Retrieval Projects

11. Special purpose information storage and retrieval is a product of the increasing division of labor in intellectual and analytical activity. It is also responsive to the explosion of knowledge and information which has made it increasingly difficult to date for central systems to meet particular needs. The result has been a growing requirement to classify and organize data to meet these special needs. Specialization tends to limit the general utility of the files, however, so that frequently the only consumers are the individuals who process and generate the information. Even where there is a wider potential audience, the data and the research methodologies used tend to be meaningful only to the specialist and to reside with him or under his control. Wherever possible, therefore, the intelligence product derived from special systems is incorporated

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into general information systems; in any case, their existence is made known to others who might find them useful. In the past, we have sought to incorporate specialized projects into general systems. Usually, however, the volume of data and the complexity of their manipulation have frustrated the attempts of general system builders to record more than the fact that special data systems exist, their relevant product, and where or with whom the systems reside.

12. Although, or even because, they are narrowly focused, we believe that specialized information systems can be highly productive, and justified both from the point of view of utility and of cost. Appropriate steps have been taken within the community to provide access to these systems in order to minimize duplication. These efforts are stimulated by common professional interests and interaction and by the maintenance and publication of the USIB File and Program Catalog. The latter provides a list of files and computer programs for the special purpose systems which have been automated.

Data Reduction Systems

13. Data reduction systems are characterized by the manipulation of large bodies of collected data (in analog form, or converted to digital form), the analysis and extraction of significant elements in the original data and the incorporation of these data into appropriate analytical files. Data reduction systems are usually coresident with special information storage and retrieval systems.

14. Most data reduction in the intelligence community results from the manipulation of data produced by technical collection devices. The product is often not usable intelligence in and of itself; but raw material for further analysis. Frequently, both raw material and analyzed intermediate information are maintained in machine files, which are copied and used by other intelligence agencies. The data sets and computer programs are less well advertised in the community than are those for special purpose information processing programs, but they seem to be as widely known and exchanged nevertheless.

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Data Transformation Systems

15. Data transformation is difficult to define with precision, because it may range from simple input functions such as key-punch, to optical character reading (OCR) systems, to elaborate analog-to-digital converters and automated printing systems. CIA activity in these systems has ranged from modest in the OCR field to substantial in analog-to-digital conversion, high precision plotting and graphics, and automated printing. The Agency has participated in government wide efforts to coordinate activity in the OCR and printing fields. It has made known to others both within the outside the government its procedures in precision plotting and automated cartographic applications despite the sensitivity of certain applications in this area. The extreme sensitivity and essentially developmental nature of much of the Agency's activity in high-speed, analog-to-digital conversion has barred widespread sharing of the results. Nonetheless, the agencies with processing responsibilities in this field have been kept informed.

Research and Development

16. Three years ago the CIA drew together into its Office of Research and Development a wide range of activities previously pursued in separate components. This office was charged with exploring information handling techniques at or near the edge of the state-of-the-art, and with developing techniques within the state-of-the-art which cannot be tested in a production environment. At present, a modest effort is being made to identify equipment and techniques which may augment intelligence information processing in the future and to explore in a laboratory environment the feasibility of incorporating them into the Agency and the community as soon as they are cost-effective. This activity is particularly important to the Agency because the intelligence production components have had little opportunity for experimentation under the twin pressures of rapidly rising flows of information from new collection devices and growing demands to produce increasingly accurate finished intelligence on an even wider range of vital issues and areas.

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ANNEX G

Defense Intelligence Agency

SUMMARY

A. APPROACH TO THE PROBLEM OF INTELLIGENCE INFORMATION HANDLING

The DIA is making a concerted effort to approach improvement of DoD intelligence from a comprehensive system point of view. This involves addressing the information substance of user requirements, defining the intelligence structure used to fulfill requirements as an information system or network, identifying inadequacies in the system in this context, and then proceeding with improvements or remedial measures.

DIA's recent design of a long-range threat assessment program, for example, represents a major effort at improvement of estimative techniques and capabilities. This typifies the problem-oriented approach to system improvement in which performance of a critical function is enhanced first by improving functional system design, then by embracing the techniques and technology which are optimum for the function. The experimental Executive Management Planning and Control System (EMPAC) views DoD intelligence as a system of interacting processes and operations on data streams and seeks to optimize the performance of the entire system by addressing its parts in the context of the whole. DIA participation in analyses initiated by the Bureau of the Budget, Director of Central Intelligence, and Secretary of Defense further contributes to this objective. The Director, DIA is actively considering organizational adjustments which will serve to focus and intensify the Agency's capabilities and efforts in this approach to intelligence and information handling problems.

B. DoD INTELLIGENCE DATA HANDLING SYSTEM

The worldwide DoD Intelligence Data Handling System (IDHS) consists of the facilities, equipment, special data communications, procedures, and personnel which provide technical and operational intelligence data handling capabilities in support of general intelligence production in U.S. Military Commands and organizations. It currently includes 49 computers installed in 21 locations.

This system has been developed on an evolutionary basis. The guiding principle has been that the system must be expanded in small enough segments so that they can be implemented before the external environment makes them obsolete, and so that their impact and effectiveness can be assessed before additional developments are implemented. To that end, the system is under frequent evaluation, both from a technical and a user point of view.

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Since its inception in 1963, the objective of the worldwide DoD IDH System has been to constantly improve intelligence data handling through the development of a system of mutually supporting facilities. Important steps which have been taken toward this end include:

- (1) The development of families of computer programming systems (e.g., the Formatted File System).
- (2) The standardization of data elements and codes.
- (3) The widespread exchange of data bases.
- (4) The availability of technical assistance to commands in their early stages of automation.
- (5) The generation of management plans which delineate the respective responsibilities of DIA, the Military Departments, the Unified and Specified Commands, and various user commands.

Periodic evaluations of the results of the IDHS efforts to date disclose that ADP is making its most significant contribution to military intelligence in the following broad functional areas:

- (1) Exploitation of photography.
- (2) Exploitation of ELINT.
- (3) Targeting.
- (4) Missile Trajectory Computations.
- (5) Foreign Ship Activity.
- (6) Various activity files pertaining to Viet Nam.
- (7) Orders of Battle.
- (8) Dissemination of Intelligence Reports.
- (9) Storage and retrieval of intelligence reports.

Looking toward the future, major improvement efforts are underway in a number of areas. Basically, these efforts center on the development of: (1) remote access, time-sharing systems to enhance support to intelligence analysts; (2) a network of secure digital data links to permit rapid exchange of information among the various commands; (3) automatic input

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devices and techniques such as the optical character reader; and (4) advanced training programs in information science for personnel at all levels. Some of the major projects currently underway are listed below and described more fully in ATTACHMENT B:

- (1) Project ANSRS (Analyst Support and Research System).
- (2) Project COINS (Community On-Line Intelligence System).
- (3) Project COLEX (CIRC On-Line Experiment).
- (4) Project VASS (Visual Analysis Subsystem).
- (5) Project PACER (Program-Assisted Console Evaluation).
- (6) Navy Ocean Surveillance System.

In general, up to the present the DoD Intelligence Data Handling System has made its most significant contribution to intelligence in the areas of basic intelligence production (installations files, orders of battle, etc.), support to the exploitation of photography and ELINT, certain types of current activity analysis (foreign ship activity), and the storage and retrieval of reports and documents. It is beginning to make a significant contribution in the areas of direct support to intelligence analysts, and management of intelligence operations. To date, it has not made a significant contribution in the areas of estimates and warning. It is these areas to which increased attention must be focused in the immediate future.

Funding and personnel data relative to the operation and maintenance of the DoD Intelligence Data Handling System for FY 1969 through FY 1973 are included as an attachment to this summary.

C. THE INFORMATION SCIENCE CENTER

The Information Science Center is being established to develop and conduct specialized courses of instruction in the application of information science to specific intelligence problems. Initial courses (scheduled for implementation in January 1969) will deal with the intelligence planning, estimates, and warning areas. Subsequent courses will address other specific categories of intelligence problems.

D. INTELLIGENCE EXPERIMENTATION CENTER

The Intelligence Experimentation Center is a developmental effort aimed at accelerating the application of modern methods, techniques, and equipments to the improvement of intelligence processes. The Center will

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use an intensive and direct experimental approach. It will design and conduct both laboratory and operational tests of innovative methods and technologies, and it will prepare implementation plans for the systematic introduction of demonstrated improvements into the operating intelligence system in DIA and in the intelligence elements of the military commands. The Intelligence Experimentation Center will be activated in FY 1969 and will respond to guidance and recommendations of the Director of Defense Research and Engineering.

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WORLDWIDE DoD IDHS - TOA

<u>TOA</u> (\$ in millions)	<u>FY 69</u>	<u>FY 70</u>	<u>FY 69 thru 73</u>
DIA	\$14.1	\$15.6	\$ 72.2
ARMY	8.0	7.6	39.7
NAVY	13.7	11.7	57.3
AIR FORCE	<u>28.0</u>	<u>24.8</u>	<u>116.6</u>
Total TOA	\$63.8	\$59.7	\$285.8

SOURCE: FYDP, January 1968

WORLDWIDE DoD IDHS - MANPOWER

	<u>FY 69</u>	<u>FY 70</u>	<u>FY 71</u>	<u>FY 72</u>	<u>FY 73</u>
DIA	508	518	518	518	518
ARMY	330	330	330	333	333
NAVY	556	558	558	558	558
AIR FORCE	<u>1,273</u>	<u>1,268</u>	<u>1,268</u>	<u>1,268</u>	<u>1,268</u>
Total	2,667	2,674	2,674	2,677	2,677

SOURCE: FYDP, January 1968

ATTACHMENT

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9 April 1968

Summary of Major Intelligence-Related
Information Handling Activities

at the

National Security Agency

INTRODUCTION

More than 85 computers are used in the NSA computer complex to organize the SIGINT data received daily in various forms from a world-wide collection effort. NSA information handling processes and systems are fused throughout the entire SIGINT production cycle, from the point of intercept through delivery to the customer. Accordingly, many NSA information handling activities are inter-twined with the SIGINT production processes and frequently cannot be separated. The production processes are oriented towards target areas or technical fields, such as ELINT.

Many of the systems used in the SIGINT process are software computer programs which use one of a number of "standard" computer configurations. These "standard" configurations include the IBM System 360/65 or the CDC 6600, or the agency developed computer complex HARVEST.

The prolific use of computers in the SIGINT process is complemented by an in-house endeavor to write the programs in an "open shop" environment. The majority of the SIGINT software development is carried out in this environment. In fact, the most useful software developments originated with the problem solving people in the production offices. Programming personnel in the computer complex have devoted their time more profitably to the specialized and more difficult areas of computer system software. "Open shop" programming has advanced the computer art at NSA because the user is confronted with

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the hard realities of his problem as it relates to the computer and is apt to resolve his own problem in his own way.

The NSA Summary of its information handling activities is separated to show some general support systems (RYE/TIPS and VIDEOFILE), natural language processing, off-line storage and retrieval systems, data preparations and conversion, communications, and research and development applications. Not included in this summary are the manual information handling systems in use in NSA.

RYE/TIPS/COINS

The most significant NSA systems related to community information handling are the RYE-TIPS/COINS Systems. The RYE system is a large scale, remote access, general purpose digital computing system. It is a real-time system which in this context is defined as the processing of transactions as they occur or as the processing is desired. RYE is designed to handle a class of problems which cannot be satisfactorily handled by any other computer system. These problems are characterized by small size, a need for immediate reaction, or a need for quick file reference. The system is designed so that an optimum number of processing tasks can be accomplished in minimum time consistent with the urgency of requests. Such problems can be handled more economically and efficiently by a centrally located large scale computer to which many users have access through remote terminal stations rather than by traditional batch processing methods or a scattering of small scale computers dedicated to specific uses or users.

The system is widely used throughout the NSA Production Organization by cryptanalysts to process encrypted traffic with diagnostic and statistical programs. In addition to many specially written programs for specific projects, a

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large library of general utility programs are available.

The RYE System has shown its operational effectiveness by the phenomenal growth in its utilization. Individual processing tasks increased from approximately 32,000 per month in January 1966 to approximately 80,000 per month in December 1967.

The Technical Information Processing System (TIPS) implements the concept of a remote access query, retrieval and data management capability. It operates on the RYE System. In TIPS, files of diverse and dynamic information pertinent to SIGINT collection, processing and analysis are maintained by appropriate offices. The files are accessible for interrogation by all approved users from any one of about 100 remote terminals.

On 1 June, the TIPS System will be connected to the Remote Access Computer System of the Air Force Security Service, Kelly AFB, Texas, for interrogation of files on each system by analysts at each location.

Based on our experiences with RYE/TIPS operations, NSA has been actively engaged in developing the COINS concept in conjunction with others in the intelligence community. Currently, on-line tests are being conducted between NSA and DIA.

VIDEOFILE

The utility of a VIDEOFILE technique is currently under NSA investigation as one approach to its document information storage and retrieval problem. This technique permits the handling of document images in analog form on magnetic tape. They are stored as TV images and are displayed on a cathode ray tube console as a TV picture. The system can retrieve images of the original documents and provide either a visual display or hard copy. Seven reels of magnetic tape can store the contents of 150 four-drawer file cabinets.

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NSA has embarked on the first phase of a three phase program to install and operate a VIDEOFILE storage system. The first phase is a pilot experimental system which will be ready for demonstration by the latter half of 1969. Follow on phases are planned but are contingent on the success and the utility of the initial phase.

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A second and the largest class of systems are those which store partially structured information in formatted files. Elements of information are recorded in natural language but tagged so that the machine may recognize the nature of the element.

A third class of systems is designed to collect information on rigidly structured organizations (e.g., military or governmental) by placing new pieces of information into a computer memory in hierarchical locations which parallels the hierarchy of the organizations themselves. By reflecting the structure of the organizations in the machine file structure, information retrieval and report publication are greatly simplified.

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The use of optical readers is one of several ways NSA is attempting to improve its data preparation and conversion processes. NSA is using keyboard operated visual display devices for direct machine record editing. These devices make corrections directly into computer storage media which eliminates extensive repunching of machine record corrections.

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In order to cope with growing volumes of communications data, both for computer processing and message distribution, NSA is actively planning an on-line computer-based data handling system. Definition is underway of a computer-based data handling complex capable of accomodating the current workload, with sufficient growth capacity to facilitate future expansions of the communication satellite data links across the Atlantic and Pacific Oceans. An internal distribution system is being installed for automatic distribution of teletype traffic. This system will use two computers at handling speeds of 400 characters per second.

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SECRETRESEARCH AND DEVELOPMENT

Some of the new concepts being explored in information handling include many aspects of software, hardware, and information system management. Two separate, but related, mass storage implementations are planned. The first is the development of a mass-storage capability (10^{12} bits) to replace the NSA computer tape library for on-line use. A mass storage system and host computer are being implemented for this replacement. The existing library is now in excess of 100,000 tapes with additional input being received at an increasing rate. Retrieval, storage and manual management of a library of this size is time-consuming and expensive in manpower. Complete, on-line, automatic management will be provided by a computer which controls the mass storage devices. Concurrently, the future large computer complexes planned will require mass storage devices of their own. The second type of implementation will provide several on-line libraries to hold a large volume of file data, in a state of ready access, to be used and generated by a single type of computer system. Ideally, these data should remain within the area of the user computer, thereby, removing the burden of handling, storage, and documentation from the tape library.

Further work is being devoted to make the computer available to the analysts through a graphics terminal. rather than a teletype or typewriter.

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Because of the steady "information explosion" in page-printing output, an automatic computer photo-typesetting system is planned to close the time-gap between completion of data processing operations and the production of a

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printed document as output. Higher speed processing and volume reduction are needed. Typesetting devices are now available that will produce, on film or paper, text matter of high quality from the output of a computer. Such a capability is being provided for the RYE System.

Other R&D tasks include: (1) development of a large multiple input switch for computers for paralleled input of data; (2) a combined mass storage and retrieval system for digital, analog, and photographic forms of information; (3) methods to relieve the demands on the processor and input-output equipment for sorting and table look-up operations by the use of associative or large memory techniques; and, (4) search for solutions to the problems of interconnecting many (i.e., ten or more) computer equipments in a centralized automated computer complex in order to provide a pool of computer capability.

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